Radial and Elliptic Flow at RHIC: Further Predictions *

P. Huovinen, P.F. Kolb †, U. Heinz†, P.V. Ruuskanen‡and S.A. Voloshin§

We have presented a variety of predictions for the elliptic flow and single-particle spectra for different hadron species produced in Au+Au collisions at $\sqrt{s} = 130\,A\,\mathrm{GeV}$, using a relativistic hydrodynamic model. We have studied the sensitivities to the equation of state and freeze-out temperature and showed that these can be used to further constrain the model parameters and test the approach on a quantitative level. A simple expression for fitting spectra and elliptic flow data in order to extract the average radial flow and flow anisotropy has been given. Crucial features of the p_t-dependence of the elliptic flow have been elucidated with a simple schematic model. Testing the predicted p_t-dependence of v_2 for many different hadron species will clarify the validity of the picture of a thermalized expanding source with a common flow velocity for all hadrons at RHIC energies.

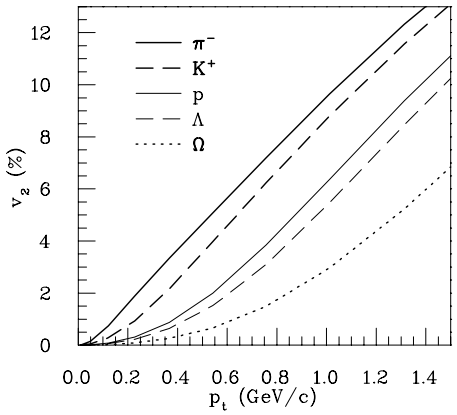

Figure 1: p_t-differential elliptic flow for various hadrons from minimum bias collisions at RHIC.

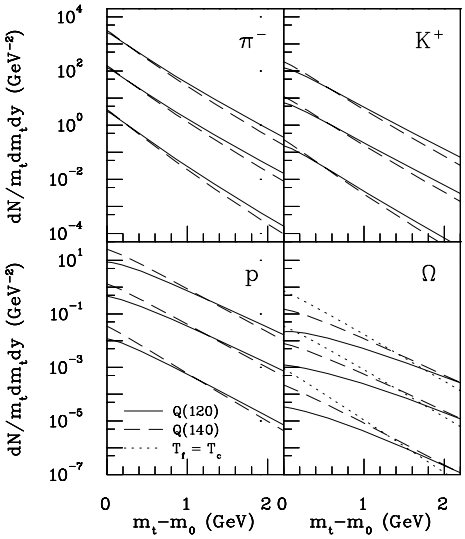

Figure 2: The m_t-spectra of negative pions (upper left), kaons (upper right), protons (lower left) and Ω baryons (lower right) for collision centralities (top to bottom) $b < 5.4$, $5.4 < b < 9.9$ and $9.9 < b < 13.5$ fm. The spectra for different centrality bins are separated by factors of 10. The calculations were done with EOS Q and freeze-out temperatures 120 and 140 MeV. The Ω distribution is also shown for $T_f = 164$ MeV to simulate decoupling at the phase transition.

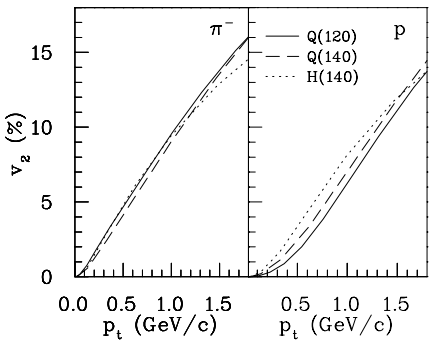

Figure 3: The effect of the EOS and the freeze-out temperature on the elliptic flow of midrapidity pions (left) and protons (right).

*LBNL-47405, hep-ph/0101136
†Ohio State U.
‡Jyväskylä U.
§Wayne State U.